UPDATE FACT SHEET *A closer look at science-based cleanup work*

Waste Area Groups 6 and 10 Environmental Investigation Complete

WASTE AREA GROUP 6 & 10

REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

- **Identifies the nature and extent of contamination at a site.**
- **Provides an assessment of the potential risks associated with a site.**
- **Provides a full analysis of cleanup alternatives.**

REMEDIAL ALTERNATIVES

Cleanup remedies proposed for a contaminated area.

INTRODUCTION

The U.S. Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency, and State of Idaho Department of Environmental Quality have completed a two-year comprehensive **remedial investigation/feasibility study** of Operable Unit (OU) 10-04 at the Idaho National Engineering and Environmental Laboratory (INEEL). OU 10-04 includes Waste Area Group (WAG) 6 — the former Boiling Water Reactor Experiment (BORAX) and Experimental Breeder Reactor I (EBR-I) facilities — as well as surface contamination sites in WAG 10. WAG 10 comprises all the area of the INEEL outside the nine major facilities (ie., WAGs 1 through 9). In all, 50 sites were investigated.

The WAG 6 and 10 investigation examined the extent of contamination, estimated risk to human health and the environment, and identified **remedial alternatives** that would reduce the risk to acceptable levels.

Two broader investigations were also part of OU 10-04. First, the Shoshone-Bannock Tribes of the Fort Hall Indian Reservation contributed a summary of what is important to them in defining and remediating risks to human health and the environment. The Shoshone-Bannock traditionally occupied the INEEL area and continue to use parts of

The INEEL is within the original territories of the Shoshone-Bannock Tribes of the Fort Hall Indian Reservation. The DOE is committed to protecting the environmental and cultural resources that are essential to the Tribes' subsistence and culture.

ECOLOGICAL RECEPTOR

A plant or animal that may be exposed to a contaminant.

INTERIM ACTION

An action taken to address an immediate threat or a well-defined problem.

TRACK 1 INVESTIGATIONS

Preliminary assessments evaluating existing knowledge of the site.

TRACK 2 INVESTIGATIONS

Evaluation of existing knowledge of the site that may require field work.

it for many cultural and economic purposes. Second, OU 10-04 investigated risks to **ecological receptors** at the INEEL. This INEEL-wide ecological risk assessment was the culmination of a multi-year effort that included collection and analysis of important ecological data as well as review of all previous risk assessments.

This fact sheet summarizes information contained in the OU 10-04 comprehensive remedial investigation/feasibility study report.

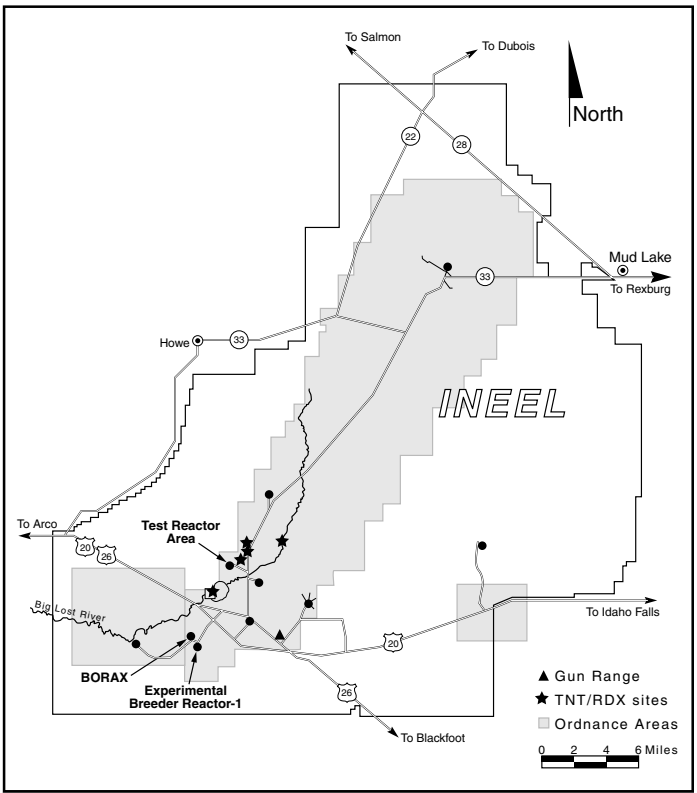
WHICH SITES WERE EXAMINED DURING THE COMPREHENSIVE INVESTIGATION?

The comprehensive remedial investigation/feasibility study examined all previous investigations of WAG 6 and 10 sites to identify and sample the sites where gaps in the data existed. The new data were added to information from previous remedial investigations, **interim actions**, and **Track 1** and **Track 2 investigations** to determine the nature and extent of contamination at WAGs 6 and 10 sites.

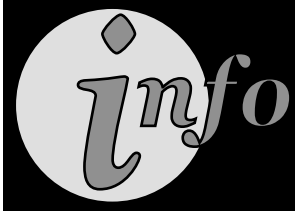
Most of the 890 square miles at the INEEL are undeveloped. WAG 10 was explicitly defined as all the land, excluding major facilities, within the boundaries of the INEEL, but it does contain various utilities such as power lines, as well as small operations structures and areas such as entrance and exit guard gates and training areas. The sites studied have mainly surface contamination, resulting from ordnance testing or ordnance disposal by the U.S. Navy and Army Air Corps beginning in the 1940s.

WAG 6 consists of sites related to EBR-I, the first reactor at the INEEL, and BORAX, used from 1953 to 1964 for reactor research. All of the EBR-I and BORAX facilities have been decontaminated and dismantled except the original EBR-I reactor building, which was decontaminated and preserved as a national historic landmark and public outreach facility.

At all WAG 6 sites requiring cleanup, remedial actions have already been completed. The OU 10-04 remedial investigation reviewed these actions as part of its scope, and determined that no additional cleanup is required at any WAG 6 sites.



The remedial investigation for Operable Unit 10-04 studied all of Waste Area Group 10 including, three World War-II era bombing and gun ranges, and Waste Area Group 6, the EBR-I and BORAX reactor areas.



The OU 10-04 study did *not* include an investigation of groundwater contamination of the Snake River Plain Aquifer. This is because the aquifer contamination study required information from several investigations that are still under way [including the remedial investigation of the Radioactive Waste Management Complex, and investigation of groundwater contamination from the Tank Farm soils and Injection Well at the Idaho Nuclear Technology and Engineering Facility (INTEC)]. The Agencies agreed to carry out the aquifer investigation separately as OU 10-08.

WHAT WERE THE RESULTS OF THE RISK ASSESSMENT?

The **baseline risk assessment** evaluated the potential adverse effects of contamination on human health and the environment. Future residents, current and future workers, ecological receptors, and Native American concerns were all considered. Risks to human health and ecological receptors associated with exposure to radionuclides, metals, and organic contaminants were estimated. The risk evaluation is called a baseline risk assessment because risk estimates are developed using the assumption that no protective measures are implemented.

The risk assessment reviewed all WAG 10 sites, including those cleaned up previously. It was determined that nine sites have contaminated soil that requires cleanup:

- Three sites, the "Ordnance Areas," where artillery testing, bombing practice, and other wartime preparations were conducted, may have **unexploded ordnance (UXO)** remaining across approximately 325 square miles.
- Five sites, the "TNT/RDX Contamination Sites," are contaminated with chemical residues from explosives, such as TNT (trinitrotoluene). The soil contamination ranges from scattered lumps to fine dust. These five sites lie within the boundaries of an Ordnance Area and may potentially contain UXO.
- One site, the "Gun Range," is contaminated with lead and fragments in the soil from fired bullets. The Gun Range was used from about 1983 to 1990 as a training area for the INEEL's security personnel.

Human Health Evaluation. The five TNT/RDX sites pose a risk to human health because of chemical residues in the soil from explosives. Cleanup decisions for contaminated soil are generally made at risk levels corresponding to a cancer incidence of 1 in 10,000 to 1 in 1 million or based on a **hazard index** compared to a threshold of 1. The highest **excess cancer risk** to an individual posed by the contaminants in the soil was determined to be 2 in 100. The highest calculated hazard index was 690.

The Gun Range poses risk from lead fragments and dust left by small arms target practice. For this site, the EPA residential screening level of 400 parts per million (ppm) was used to determine whether cleanup would be necessary. At the Gun Range, the maximum contaminant concentration detected in the soil is 24,400 ppm.

Across the Ordnance Areas, UXO poses a physical risk to human safety if an explosion is triggered from handling or contact, especially by machinery. Because the risk is from explosion, rather than chronic exposure to chemicals, numerical calculations of excess cancer risk, hazard index, and hazard quotient are not applicable. Approximately 325 square miles of the INEEL may contain UXO.

BASELINE RISK ASSESSMENT

An assessment used to evaluate potential risks to human health and the environment.

UNEXPLODED ORDNANCE (UXO)

Military munitions that have been primed, armed, or fused, and fired, dropped, or launched, but which have failed to explode through malfunction or design. Unexploded ordnance poses a physical risk to human safety through the danger of explosion when it is handled or contacted, especially by machinery.

HAZARD INDEX

A ratio between the contaminant intake concentrations and the concentrations that are not likely to cause adverse effects. The hazard index measures potential adverse health effects other than cancer (such as liver or kidney damage caused by exposure to contaminants), especially to sensitive populations such as children or pregnant women.

EXCESS CANCER RISK

The increased risk of developing cancer resulting from exposure to contaminants at a release site.

Ecological Risks. An ecological risk assessment was conducted for each contaminated site within WAGs 6 and 10. The ecological risk assessment determined that risks are posed to ecological receptors at the TNT/RDX Contamination Sites and at the Gun Range. For the Ordnance Areas, the ecological risk assessment concluded that no unacceptable risks are posed to ecological receptors from accidental detonation. It is unlikely that an ecological receptor could strike an ordnance item with sufficient force to explode it.

The results of the site-specific assessments were re-evaluation under the INEEL-wide ecological risk assessment, which was conducted as a separate part of this OU 10-04 investigation.

INSTITUTIONAL CONTROLS

Administrative measures to protect current and future users from exposure to contamination. At the OU 10-04 sites, the controls may include access restrictions (such as signs) and land use restrictions.

WHAT ALTERNATIVES ARE BEING CONSIDERED?

The feasibility study identified potential remedial alternatives based on data obtained during the remedial investigation and baseline risk assessment. Two alternatives considered for all the sites include No Action and Limited Action. However, only the Ordnance Areas further assessed the Limited Action alternative after the preliminary screening of alternatives.

Alternative 1
No Action. The No Action alternative assesses the consequences of leaving a site in its current state. It serves as a baseline for comparing the effectiveness of other alternatives. The only activity associated with this alternative is long-term monitoring.

Alternative 2
Limited Action. Includes environmental monitoring and other **institutional controls** such as signs, access restrictions, land use restrictions, subsidence repairs, and runoff control.

Ordnance Areas. Two alternatives were considered for the Ordnance Areas in addition to the No Action alternative:

Alternative 2
Limited Action and Institutional Controls. In addition to institutional controls, Limited Action would include performing surveys to detect potential UXO in areas only an activity is planned.

Alternative 3
Detection and Removal, and Institutional Controls. Actions under this alternative would include performing surveys to detect potential UXO in select areas where known ordnance testing occurred with live ordnance. Any detected UXO would then be removed and detonated (if live) or disposed of (if inert or "dummy"). However, because the surveys may not be 100% efficient, institutional controls will be necessary as long as an unacceptable risk remains. During these surveys, the boundaries for the naval gun and bombing ranges will more clearly be defined.

TNT/RDX Contamination Sites. Variations on the following two alternatives were considered in addition to the No Action and Limited Action alternatives for the TNT/RDX Contamination Sites.

Alternative 3
Removal, Treatment of TNT/RDX Fragments, Disposal of Soil, and Institutional Controls. In addition to institutional controls, any UXO detected within these areas would be removed or disposed of. The TNT/RDX contaminated soil would be

excavated. Visible lumps and fragments of TNT and/or RDX would be separated from the soil and disposed of by detonation. The remaining contaminated soil would be transported to a disposal facility on or off-site and each site would be contoured and vegetated as needed.

Alternative 4
Removal, Treatment of TNT/RDX Fragments, Disposal or Return of Soil, and Institutional Controls. Unexploded ordnance would be removed, if present. The contaminated soil would be excavated, and visible lumps and fragments of chemical contaminants would be separated out and disposed of by detonation. The remaining contaminated soil would then be transported to an off-site facility for incineration or it would be treated by composting and, following treatment, returned to the excavations.

Gun Range. Variations to the following alternative were considered for the Gun Range in addition to the No Action and Limited Action alternatives:

Alternative 3
Removal, Treatment, and Disposal or Return of Soil. All soil contaminated with lead above 400 parts per million (ppm) would be excavated. Physical sorting would remove larger metal fragments such as bullets and casings; the collected fragments would be sent off-site for metal recycling. The contaminated soil would be treated either by stabilization or by washing with an acid to remove the lead.

NATIVE AMERICAN SCENARIO

The INEEL is within the original territories of the Shoshone-Bannock Tribes of the Fort Hall Indian Reservation. A wide variety of natural and cultural resources and landscape features at the INEEL directly reflect tribal cultural heritage. The Tribes consider these resources of great importance in maintenance their spiritual and cultural values and activities, oral tradition and history, mental and economic well being, and overall quality of life. The DOE is committed to protecting not only the health and safety of the Tribes but also the environmental and cultural resources that are essential to their subsistence and culture.

To enhance understanding of Shoshone-Bannock concerns, particularly those directly associated with OU 10-04, the INEEL contracted directly with the Shoshone-Bannock Tribes to provide unique input for this remedial investigation. In the holistic worldview described in the tribal analysis, concerns about land, air, water, plants, animals, and humans are paramount and all are interconnected. Changes, disturbances, and perceived voids in this native landscape ecology create an imbalance that extends through the entire traditional and spiritual ecosystem. At the INEEL, contamination and modern disturbances contribute to a perceived imbalance and are unacceptable to the Tribes. No thresholds, such as the screening levels established by the EPA, are recognized in the tribal risk assessment. Even so, it is clear that sites that do exceed quantitative thresholds for risk to human health or ecological receptors will also be adverse to Shoshone-Bannock tribal concerns. While the qualitative tribal perspective is distinct from systematic ecological risk assessment methodologies, the two approaches do share a common goal of preserving a diverse and healthy environment. Therefore, it is understood that remedial actions to protect human health and the environment, in conjunction with ongoing tribal consultation, can begin to address the holistic Native American concerns.

INEEL INFORMATION REPOSITORIES

INEEL Technical Library
DOE Public Reading Room
1776 Science Center Dr.
Idaho Falls, ID 83415
(208) 526-1185

University of Idaho Library
University of Idaho Campus
Moscow, ID 83843
(208) 885-6344

Albertson Library
Boise State University
1910 University Dr.
Boise, ID 83725
(208) 385-1621

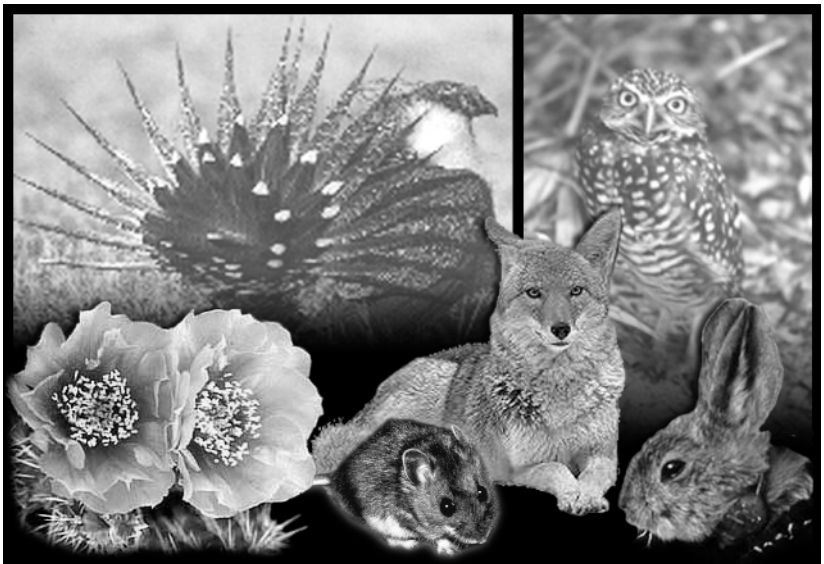
The Administrative Record may be accessed on the Internet by typing http://ar.inel.gov/home.html on the command line. Any library with the Internet can access the Administrative Record. The Operable Unit 10-04 investigation is part of the Administrative Record.

INEEL-WIDE ECOLOGICAL RISK ASSESSMENT

The purpose of the INEEL-wide ecological risk assessment was to investigate the effects of contamination on the environment of the INEEL as a whole. More than 200 species of plants and animals live on the INEEL. To understand how contamination may affect them, many more factors must be considered than in a human health risk assessment. The ecological risk assessment must take into account wide variation in ranges, including migration patterns, and the tendency for many contaminants to accumulate as they move up the food chain. Finally, since many plant and animal species on the INEEL have not been extensively studied in terms of their habitat requirements, life cycle, or tolerance to the range of contaminants released, the ecological risk assessment has a number of areas of uncertainty.

HAZARD QUOTIENT

A measure of potential adverse effects to plants or animals. At sites with hazard quotients above 10 for ecological risk, remediation is considered.



More than 200 species of plants and animals live on the INEEL. The INEEL-wide ecological risk assessment investigated the effects of contamination on the environment of the INEEL as a whole.

Investigations at the waste area groups identified contaminated sites across the INEEL that could pose risks to ecological receptors. The INEEL-wide assessment evaluated those sites with a **hazard quotient** above 10. Remediation is already in progress or has been completed at 28 of these sites. Six OU 10-04 sites were evaluated in the OU 10-04 RI/FS and will be remediated pursuant to the decisions made in the Record of Decision for this investigation.

Spatial analysis indicated that most contamination at the INEEL is from past activities inside the facility areas, which make up less than 5% of the INEEL's total land. The study concluded that chronic effects to ecological receptors from low levels of contamination are difficult to detect. However, it appears that the contamination in the facility areas has had minimal impact on the plant and animal communities beyond the facilities.

SITES NOT REQUIRING CLEANUP

The Agencies agree that 41 sites within OU 10-04 do not require cleanup. These sites were identified during the OU 10-04 investigation and are presented in Table 1 below. However a few of these sites will remain under institutional controls until **unrestricted release** is approved during a 5-year review. These sites have been identified with an asterisk (*).

Table 1. Waste Area Group 6 and 10 sites not requiring cleanup.

WAG 6	*BORAX-01:*	*BORAX II —V Leach Pond**
	BORAX-02:	*BORAX I Burial Site**
	BORAX-03:	*BORAX Argonne Experimental Facility (AEF) Septic Tank (AEF-703)*
	BORAX-04:	*BORAX Trash Dump*
	BORAX-05:	*BORAX Fuel Oil Tank, Southwest of AEF-602*
	BORAX-07:	*BORAX Inactive Fuel Oil Tank by AEF-601*
	BORAX-08:	*BORAX V Ditch**
	BORAX-09:	*BORAX II —V Reactor Building**
	EBR-02:	*EBR-I Septic Tank (AEF-702) and Seepage Pit (AEF-703)*
	EBR-03:	*EBR-I Seepage Pit (WMO-702)*
	EBR-04:	*EBR-I Septic Tank (WMO-701)*
	EBR-05:	*EBR-I Cesspool, Septic Tank (EBR-709), and Seapage Pit (EBR-713)*
	EBR-06:	*EBR-I Septic Tank (EBR-714) and Seepage Pit (EBR-716)*
	EBR-07:	*EBR-I (AEF-704) Fuel Oil Tank at AEF-603*
	EBR-08:	*EBR-I Fuel Oil Tank (WMO-703)**
	EBR-09:	*EBR-I Fuel Oil Tank at WMO-601 (WMO-704)**
	EBR-10:	*EBR-I Gasoline Tank (WMO-705)*
	EBR-11:	*EBR-I Fuel Oil Tank (EBR-706)*
	EBR-12:	*EBR-I Diesel Tank (EBR-707)*
	EBR-13:	*EBR-I Gasoline Tank (EBR-708)*
	EBR-14:	*EBR-I Gasoline Tank (EBR-717)**
	EBR-15:	*EBR-I Radionuclide Soil Contamination**
WAG 10	*ARVFS-01:*	*Army Reentry Vehicle Facility Site Containers of Contaminated NaK*
	ARVFS-02:	*Army Reentry Vehicle Facility Site Tank Containing Low-Level Radioactive Waste*
	CPP-66:	*CPP Fly Ash Pit*
	DF-1:	*Dairy Farm Disposal Pit*
	EOCR-01:	*Experimental Organic-Cooled Reactor Leach Pond*
	EOCR-02:	*Experimental Organic-Cooled Reactor Injection Well*
	EOCR-03:	*Experimental Organic-Cooled Reactor Oxidation Pond*
	EOCR-04:	*Experimental Organic-Cooled Reactor Septic Tank*
	EOCR-05:	*Experimental Organic-Cooled Reactor Blowdown Sump (EOCR-719)*
	LCCDA-01:	*Liquid Corrosive Chemical Disposal Area Old Disposal Pit (west end)**
	LCCDA-02:	*Liquid Corrosive Chemical Disposal Area Limestone Treatment and Disposal Pit (east end)**

UNRESTRICTED RELEASE

Sites that no longer require institutional controls because risk levels are considered safe for human health and the environment.

OMRE-01:	*Organic-Moderated Reactor Experiment Leach Pond**
ORD-2:	*Naval Ordnance Test Facility**
ORD-21:	*Juniper Mine**
ORD-23:	*Rifle Range (also called Firing Range)**
ORD-29:	*Big Southern Butte*
STF-01:	*Security Training Facility and STF-601 Sumps and Pits*
ZPPR-01:	*Zero Power Physics Reactor Disposal Pit (outside ANL-W fence)*
	*Telecommunication Cable**

[a]CPP Fly Ash Pit (CPP-66) is a WAG 3 site evaluated for ecological receptors in the OU 10-04 RI/FS. Risk assessment results indicate there was no significant risk to ecological or human receptors. EBR-05, [EBR-I cesspool, septic tank (EBR-709), and seepage pit (EBR-713)] is an active site in WAG 6.

PUBLIC INVOLVEMENT

If you would like a briefing on the Operable Unit 10-04 investigation or further information on the descriptions of no action and no further action sites, please call the INEEL Community Relations Office at (208) 526-4700 or the INEEL's toll-free number at (800) 708-2680. An opportunity for public comment will be provided during the public meetings on the Operable Unit 10-04 proposed plan, which are scheduled for February of 2002.

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Idaho Falls, ID 83403-2047
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